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ABSTRACT

This paper zeroes in on a subset of descriptors and predictors of undergraduate success, namely those which are neither cognitive measures (such as, high school grade point averages or aptitude test scores) nor personality test variables. The descriptors and predictors considered are broadly classed as: high school related; family and peer related; and student related. Articles published since 1966 are reported for each descriptor or predictor and typified according to whether the results reported were "meaningful" or "not meaningful." The lack of uniformity in definition of descriptors and predictors, the variety of undergraduate success criteria, the diversity of statistical techniques employed, and the wide-range of sampling approaches used, all pose hazards in drawing conclusions. (Author)

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Non-Intellective Descriptors and Predictors of Undergraduate Success: A Brief Review of the Recent Literature

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This paper zeroes in on a subset of descriptors and predictors of undergraduate success, namely those which are neither cognitive measures (such as, high school grade point averages or aptitude test scores) nor personality test variables. The descriptors and predictors considered are broadly classed as: high school related; family and peer related; and student related. Articles published since 1966 are reported for each descriptor or predictor and typified according to whether the results reported were "meaningful" or "not meaningful." The lack of uniformity in definition of descriptors and predictors, the variety of undergraduate success criteria, the diversity of statistical techniques employed, and the wide-range of sampling approaches used, all pose hazards in drawing conclusions.

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Non-Intellective Descriptors and Predictors of Undergraduate Success: A Brief Review of the Recent Literature

Virginia A. de Wolf

A myriad of articles dealing with descriptors and predictors of academic success engulf the literature. This paper attempts to zero in on a subset of these, the non-intellective ones. Perhaps they can be most readily described by what they are not--they are neither cognitive measures, such as high school (HS) grade point averages (GPAs) nor HS percentile rank or aptitude test scores, nor personality test variables. Essentially, the areas tapped in this review can be grouped under three broad headings: HS related; family and peer related; and student related characteristics. Before describing these three categories, certain limitations of this survey should be noted.

First, the term "undergraduate success" used in the title was very diverse. One obvious criterion of undergraduate success used was graduation (Abel, 1966; Bayer, 1968; Frank & Kirk, 1970; Hall, 1972; Hill, 1966; Irvine, 1966; Keenen & Holmes, 1970; Mack, 1973; Maclay, 1968; Nicholson, Note 1; Sewell, 1971; Smelser & Stewart, 1968; Spady, 1971; Trent, 1966; Wegner & Sewell, 1970; Zaccaria & Creaser, 1971). However, certain authors sometimes distinguished between different types of graduation statuses: for example, graduation within four, five, or seven years of entrance; graduation from the college attended first after HS graduation or graduation from any college; or reception of the associate arts degree from a junior college or transferring to a four-year college. As one can see, this group of articles differed greatly on the interpretation of the term graduation.

Another measure of undergraduate success considered was the students' GPAs (Alexakos, Stankowski, & Sanborn, 1967; Ashcraft, 1969; Bergen, Upham, & Bergen, 1970; Burgess, Duffy, & Temple, 1972; Butzow & Williams, 1967; Clements, Note 2; Cole & Miller, 1967; Colgan, Note 3; Coombs & Davies, 1966; Cooper & Foy, 1969; Coppedge, 1969; Costello, 1968; Dale & Miller, 1972; Dickason, 1969; Ellish, 1969, Entwistle, Nisbet, Entwistle, & Cowell, 1971; Gallessich, 1970; Hamerlik & Brown, Note 4; Hamilton, 1970;

Hay, Evans, & Lindsay, 1970; Hay & Lindsay, 1969; Henry, 1967; Hinrichsen, 1972; Hood, 1967; Jones, F. M., Note 5; Jones, J. G., 1968; LeGrand, Piercy, & Panos, Note 6; Lindsay & Althouse, 1969; Linn & Davis, Note 7; Marks, 1967; Maxwell, Note 8; Merritt, 1970; Miller & O'Connor, 1969; Nichols, 1966; Owen & Feldhusen, 1970; Reed, Feldhusen, & Van Mondfrans, 1973; Schuster, 1971; Skager, Klein, & Schultz, 1967; Spady, 1971; Vraa, 1971; Watley & Merwin, 1967; Weigel & Weigel, 1967; Wilson, Note 9; Worthington & Grant, 1971; Zedeck, Cranny, Vale, & Smith, 1971). Again, there was no uniformity in the definition of the GPA used as the criterion.

A third popular measure of success used as a criterion was one which distinguished among various academic statuses--excluding graduating; for example, persisters vs. nonpersisters, or still in school vs. voluntary withdrawals vs. academically dismissed. Persistence could refer to persistence in a particular program, ex. engineering, or to persistence within an entire university system (Athanasiou, 1971; Baber & Caple, 1970; Blanchfield, 1971; Clements, Note 2; Dole, 1969; Goetz & Leach, 1967; Gustavus, 1972; Hackman & Dysinger, 1970; Irvin, 1967; Kapur, 1972a, 1972b; Lautz, MacLean, Vaughan, & Oliver, 1970; Linn & Davis, Note 7; MacMillan, 1970; Marks, 1967; Morrisey, 1971; Robinson, 1969; Rossmann & Kirk, 1970; Savicki, Schumer, & Stanfield, 1970; Spady, 1971; and Warriner, Foster, & Trites, 1966).

A few of the authors modified or combined these criteria of success. Persistence and graduation status were classed together and contrasted with the other academic statuses in Johansson and Rossmann (1973), and Panos and Astin (1968). Predictors relating to students with "overpredicted" GPAs and those with "underpredicted" GPAs concerned Flaugher and Rock (1969), and Reitz (1970). Collegiate extracurricular achievement was explored by Baird (1969) and by Nichols (1966), while Baird and Richards (Note 10) examined the predictors of extracurricular achievement and how they would fare if used as predictors of GPA. Items which differentiated those who attended college from those who did not were examined by Hansen, Gold, and Labovitz (1972), Sewell (1971), Smelser and Stewart (1968), and Trent (1966). Prediction of the quality of design students' illustrations and drawings was examined by Skager et al. (1967).

Another consideration to be kept in mind was the variety of samples used in the various references cited. Some authors had samples composed of members of one sex only (ex., male--Abel, 1966, Irvine, 1966, Nicholson, Note 1, Vraa, 1971, and Wegner & Sewell, 1970; and female--White, 1974), some were comprised of certain major groupings (elementary education majors--Reitz, 1970; engineering students--Athanasiou, 1971, Dickason, 1969, and Gallessich, 1970; forestry--Frank & Kirk, 1970; nursing--Burgess et al., 1972, Owen & Feldhusen, 1970, and Reed et al., 1973; and pharmacy--Cooper & Foy, 1969), while others examined differences in student success in specialized institutions (for example, junior colleges--Ellish, 1969, Hall, 1972, Linn & Davis, Note 7, and MacMillan, 1970; and school of design--Skager et al., 1967). F. M. Jones (Note 5) explored the fate of junior college transfer students into an upper-division program versus the progress of native students. Lautz et al. (1970) and Schuster (1971) looked at descriptors and predictors of readmitted students who were previously academically suspended. A final note on sampling differences--in some cases authors matched their samples for ability, sex, etc. In others, they didn't.

And now, a description of the descriptors and predictors. High school related items are contained in Appendix A, family and peer related in Appendix B, and student related in Appendix C. In each appendix, the articles including a particular item in their study are divided into two groups--those who found that entry to be a "meaningful" descriptor or predictor of undergraduate success and those who found it to be "not meaningful." Under the "meaningful" heading is included all reports which indicated <u>some</u> contribution of the predictor--significant correlations, both positive and negative, with the criterion used, significant chi squares, or that the item mentioned was used in a multiple regression equation. If an author reported that the item was useful for at least one of the groups under discussion (i.e., for females but not for males, or for voluntary withdrawals but not for academic failures), it is listed under the "meaningful" group. Along the same lines, if the author reported that the zero-order correlation was statistically significant but that the item did not contribute to a multiple regression equation, it is listed with the

"meaningful" articles. Occasionally, an author would indicate that a certain item was important in differentiating students in the various success categories but did not present statistical evidence of his/her conclusion. These, too, are included under the "meaningful" heading. All other articles are listed under the heading of "not meaningful."

Nonintellective descriptors and predictors related to attributes of the high school in Appendix A are:

-achievement, nonacademic

(1) nonathletic awards, prizes, club memberships, offices held, and any nonathletic extracurricular achievement and participation; and

(2) athletics, importance of;

-diploma track (ex., college prep or not) or type of certificate received (British);

-quality of HS, quality of HS's college prep program, or percent of graduating class attending college;

-ratings or reports of students from

(1) HS counselors;

(2) HS headmaster or principal; and

(3) HS teachers;

-size of

(1) graduating class or total HS; and

(2) faculty;

-type (ex. public, private, or parochial);

-miscellaneous, including

(1) geographic location of HS;

(2) guidance facilities at HS--present or absent?

(3) socioeconomic status of families attending HS;

(4) racial makeup of HS, both faculty and student body; and

(5) teachers' encouragement to continue education--present absent?

The second broad category of descriptors and predictors found in the literature are those associated with the students' families and peers. The major headings listed in Appendix B are:

-education of parents

(1) father; and

(2) mother;

-encouragement of parents to continue education, the value of higher education to parents, or educational expectations of parents for children;

-income of family or welfare status of family;

-marital status of parents or "family" status, i.e., broken home or not;

-occupationally related

(1) father's occupation;

(2) mother's occupation; and

(3) which parent works to support family;

-socioeconomic status of family;

-sibling related

(1) birth order among sibs; and

(2) number of sibs or number of younger sibs;

-miscellaneous, including

(1) automobile of family--model and year;

(2) books, number of in the home;

(3) hobbies and non-work activities of parents;

(4) home--owned or not? and

(5) peer encouragement to continue education--does it exist or not?

Only this last entry concerns peers; Appendix B, therefore, primarily includes family related descriptors and predictors.

The final set of predictors, listed in Appendix C, is the lengthiest. Student related descriptors and predictors of undergraduate success include:

-age;

-financial

(1) amount of concern about ability to finance education;

(2) loans, reception of;

(3) parents, reception of financial assistance from; and

(4) scholarships or "non-returnable" financial assistance (ex., grants), reception of;

-marital status or intent of student, parental status of student (i.e., is student a parent or not?), or is student engaged or not?

-motivation (including both type and intensity of), commitment to graduating from this particular college, or commitment to obtaining a degree;

-racial, ethnic, or religious background of student;

-residency

(1) in-state or out-of-state;

(2) population of home town, rural or urban home background, or farm or non-farm background; and

(3) region of origin;

-schooling, past

(1) total number of schools attended, both HS and elementary; and

(2) total number of years of education prior to admission to college;

-sex;

-study habits, number of hours of effective study per week, or number of hours of study per week;

-working while in college

(1) employed or not while in college, number of hours employed while in college, or salary; and

(2) is employment had while attending college relevant to student's major field of study or not?

-miscellaneous, including

(1) frequency of church attendance;

(2) letters of readmission for those students previously dropped for academic failure;

(3) pre-college entrance interviews or pre-program entry ratings of students by faculty; and

(4) veteran's status.

Most of the above descriptors and predictors are quite clear in meaning. A few, however, are confusing. For instance, socioeconomic status (both parental and HS) does not mean the same for each researcher and sometimes included weighted combinations of parental income, occupation, or education--each of which are included under separate headings in Appendix B. Similarly, classifications of parental education and occupations are equally unique, ex. one author might use college graduation of parents as his/her measure of parental educational level, while another might consider any amount of college attendance by either parent as his/her educational success level. Under Appendix C, the sex of student deserves a little explanation. Articles included under the heading of "meaningful"

are one of the following: sex was a statistically significant predictor; sex contributed to a multiple regression equation; different regression equations were found to be needed for each sex; or that at least one of the predictor correlates or trends considered in the article was reported to be different for each sex. If sex was not a statistically significant predictor, if sex did not contribute to the multiple regression equation, if different regression equations were not necessary for each sex, or if all of the descriptors and predictors considered were not meaningful for both sexes, only then was the article included under the heading of "not meaningful."

It is my impression that HS non-athletic, nonacademic awards, prizes, club memberships, offices held, etc., was the most promising nonintellective predictor in Appendix A, particularly when the success criterion was nonacademic, nonathletic collegiate achievement (Baird, 1969; Baird & Richards, Note 10; Nichols, 1966). As Skager et al. (1967, p. 115) reported, "correlations for females between drawing performance and two scores on the IAQ [the Independent Activities Questionnaire is the authors' questionnaire about accomplishments at the secondary school level]...suggest that past accomplishments of a creative type are related to quality of product."

Examining Appendix B, the amount of parental encouragement to pursue higher education and the value of higher education to parents seems the likeliest candidate for future consideration among the group of family and peer related descriptors and predictors. This was especially useful when the success criterion was differentiation among students with different academic statuses (Bayer, 1968; Hackman & Dysinger, 1970; Kapur, 1972a; MacMillan, 1970; Marks, 1967; Sewell, 1971; Trent, 1966).

Of all of the nonintellective descriptors and predictors included in this review, the one which most warrants further consideration is student motivation, included in Appendix C. Under this sub-heading of motivation is included student's attitude regarding the importance of a college education, the value to and expectation of the student of doing well academically, student commitment to obtaining a degree or commitment to graduating from a particular college, the value or necessity of advanced education for the student's intended vocation, and certainty of the student's

occupational plans. Student motivation and collegiate GPA was explored by many authors (Abel, 1966; Alexakos et al., 1967; Cole & Miller, 1967; Coombs & Davies, 1966; Costello, 1968; Dickason, 1969; Ellish, 1969; Entwistle et al., 1971; Hall, 1972; Hamilton, 1970; Jones, J. G., 1968; Lindsay & Althouse, 1969; Marks, 1967; Reitz, 1970; Wilson, Note 9; Worthington & Grant, 1971). Motivation as a discriminator among student groups having different academic statuses, including graduation, was found to be meaningful in Athanasiou (1971), Bayer (1968), Dole (1969), Goetz and Leach (1967), Gustavus (1972), Hackman and Dysinger (1970), Hansen et al. (1972), Hill (1966), Irvin (1967), Kapur (1972a, 1972b), Keenen and Holmes (1970), Linn and Davis (Note 7), MacMillan (1970), Marks (1967), Rossmann and Kirk (1970), Sewell (1971), Spady (1971), and Wegner and Sewell (1970).

Although these descriptors and predictors were selected because they were neither traditional academic predictors nor personality predictors, the authors cited did not make an effort to include just one of these three groups of predictors in their articles. Therefore, in the case of multiple regression equations, academic and personality predictors were also frequently used. Consequently, a reader attempting to interpret the "meaningfulness" of one of these nonintellective predictors, when used in multiple regression analyses, should note differences in the data bases of the several articles.

Realizing the lack of uniformity in definitions of descriptors and predictors and success criteria, the diversity of statistical techniques employed, and the wide-range of sampling approaches used, the reader may wonder how to formulate any conclusions about the relationships of these nonintellective descriptors and predictors to undergraduate success. Unfortunately, aside from saying that there are a large number of such relationships presented in the literature, it is difficult to draw conclusions. As a matter of fact, caution is called for even when gross comparisons are made among the different studies--just because several articles have shown that higher economic status and being male correlated with the attainment of a bachelor's degree, let's say, clearly does not permit the present day educator to propose restricting college entrance to male children of the upper economic strata. There are compelling social reasons for not perpetuating certain "predictabilities."

What one can do with the material presented in this paper is to use it as a spring-board for thought and discussion. The most sensible approach, in my mind, is to first decide upon a particular undergraduate success criterion. While keeping those predictors which the reader has decided to be the most fruitful in the back of his/her mind, the articles concerning the selected success criterion, having been cited in the beginning section of this article, can then be more closely scrutinized and the results of similar studies used to better pose future research questions.

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Appendix A. High school related descriptors and predictors categorized according to meaningfulness of results of research cited.

Items	Meaningful*	Not meaningful**
ACHIEVEMENTS, NONACADEMIC	Baird, 1969	Spady, 1971
(1) awards, prizes, club memberships, offices held, any nonathletic extracurricular achievement and participation	Baird & Richards, Note 10 Nichols, 1966 Panos & Astin, 1968 Skager et al., 1967 Worthington & Grant, 1971	
(2) athletics, importance of		Vraa, 1971
DIPLOMA TRACK OR TYPE OF CERTIFICATE (BRITISH)	Kapur, 1972a, 1972b	Ashcraft, 1969 Lautz et al., 1970
QUALITY; PERCENT OF CLASS ATTENDING COLLEGE	Marks, 1967 Miller & O'Connor, 1969 Spady, 1971	Bayer, 1968 Maclay, 1968
RATINGS		
(1) counselor's	Colgan, 1969 Nicholson, Note 1	
(2) headmaster's or principal's	Hamilton, 1970	
(3) teachers'	Colgan, Note 3 Coppedge, 1969	
SIZE		
(1) class's or total high school enrollment	Clements, Note 2 Irvine, 1966 Mack, 1973	Baber & Caple, 1970 Bayer, 1968 Gallessich, 1970 Hill, 1966 Jones, F. M., Note 5 Kapur, 1972a, 1972b Panos & Astin, 1968 Spady, 1971 Vraa, 1971 Watley & Merwin, 1967
(2) faculty's	Mack, 1973	Bayer, 1968
TYPE		Bayer, 1968 Butzow & Williams, 1967 Kapur, 1972a, 1972b Lautz et al., 1970 Maclay, 1968
MISCELLANEOUS	Dale & Miller, 1972	Watley & Merwin, 1967
(1) geographic location	Worthington & Grant, 1971	
(2) guidance facilities: present or absent?		Bayer, 1968
(3) Socioeconomic status of families attending	Hanson et al., 1972	
(4) racial makeup	Mack, 1973	
(5) teachers' encouragement: present or absent?		Sewell, 1971

*Under this heading are listed all articles which reported some contribution of the descriptor or predictor. Meaningful contributions included both those which were statistically significant and those results which indicated trends.

**Under this heading are listed all articles reporting that this particular descriptor or predictor did not contribute to determination of undergraduate success criterion.

Appendix B. Family and peer related descriptors and predictors categorized according to meaningfulness of results of research cited.

Item	Meaningful*	Not meaningful**
EDUCATION	Burgess et al., 1972	Bayer, 1968
(1) father	Dole, 1969	Goetz & Leach, 1967
	Flaugher & Rock, 1969	Reed et al., 1973
	Gustavus, 1972	Rossmann & Kirk, 1970
	Kapur, 1972a, 1972b	Vraa, 1971
	Owen & Feldhusen, 1970	
	Panos & Astin, 1968	
	Sewell, 1971	
	Spady, 1971	
	Warriner et al., 1966	
(2) mother	Goetz & Leach, 1967	Bayer, 1968
	Kapur, 1972a, 1972b	Gustavus, 1972
	Panos & Astin, 1968	Owen & Feldhusen, 1970
	Sewell, 1971	Reed et al., 1973
	Warriner et al., 1966	Rossmann & Kirk, 1970
		Spady, 1971
		Vraa, 1971
ENCOURAGEMENT; VALUE OF HIGHER EDUCATION TO PARENTS	Bayer, 1968	Rossmann & Kirk, 1970
	Hackman & Dysinger, 1970	Skager et al., 1967
	Kapur, 1972a	
	Linn & Davis, Note 7	
	MacMillan, 1970	
	Marks, 1967	
	Sewell, 1971	
	Trent, 1966	
INCOME; IS FAMILY ON WELFARE OR NOT?	Baber & Caple, 1970	Bayer, 1968
	Goetz & Leach, 1967	Panos & Astin, 1968
	Sewell, 1971	Rossmann & Kirk, 1970
	Worthington & Grant, 1971	
MARITAL STATUS; "FAMILY" STATUS	Spady, 1971	Baber & Caple, 1970
		Bayer, 1968
		Goetz & Leach, 1967
		Kapur, 1972a
		Maclay, 1968
OCCUPATIONALLY RELATED	Kapur, 1972a, 1972b	Bayer, 1968
(1) father's occupation	Sewell, 1971	Butzow & Williams, 1967
	Spady, 1971	Gustavus, 1972
	Trent, 1966	Hill, 1966
		Owen & Feldhusen, 1970
		Panos & Astin, 1968
		Reed et al., 1973
		Rossmann & Kirk, 1970
(2) mother's occupation		Owen & Feldhusen, 1970
		Reed et al., 1973
		Rossmann & Kirk, 1970
(3) which parent supports the family		Baber & Caple, 1970

Appendix B (continued)

Item	Meaningful*	Not meaningful**
SOCIOECONOMIC STATUS	Hall, 1972 Linn & Davis, Note 7 Morrisey, 1971 Nicholson, Note 1 Savicki et al., 1970 Sewell, 1971 Wegner & Sewell, 1970 Zaccaria & Creaser, 1971	Maclay, 1968 Skager et al., 1967 Smelser & Stewart, 1968
SIBLINGS	Lautz et al., 1970	Bayer, 1968
(1) birth order among sibs	Smelser & Stewart, 1968	Kapur, 1972a, 1972b Maclay, 1968
(2) number of sibs; number of younger sibs	Worthington & Grant, 1971	Baber & Caple, 1970 Bayer, 1968 Maclay, 1968
MISCELLANEOUS		
(1) automobile, model or year		Baber & Caple, 1970
(2) books, number of in the home		Bayer, 1968
(3) hobbies and activities of parents		Skager et al., 1967
(4) home: owned or not?	Baber & Caple, 1970	
(5) peer encouragement to attend college?	Sewell, 1971	Bayer, 1968

*Under this heading are listed all articles which reported some contribution of the descriptor or predictor. Meaningful contributions included both those which were statistically significant and those results which indicated trends.

**Under this heading are listed all articles reporting that this particular descriptor or predictor did not contribute to determination of the undergraduate success criterion.

Appendix C. Student related descriptors and predictors categorized according to meaningfulness of results of research cited.

Item	Meaningful*	Not meaningful**
AGE	Hill, 1966 Kapur, 1972a, 1972b Mack, 1973 Owen & Feldhusen, 1970 Reed et al., 1973	Clements, Note 2 Gustavus, 1972 Maclay, 1968
FINANCIAL		
(1) amount of concern about financing education	Lautz et al., 1970 Robinson, 1969	
(2) loans, reception of	Kapur, 1972a	Baber & Caple, 1970 Blanchfield, 1971
(3) parents, reception of financial assistance from	Kapur, 1972a	
(4) scholarships and "non-returnable" assistance, reception of	Baber & Caple, 1970 Bergen et al., 1970 Blanchfield, 1971	
MARITAL STATUS; MARITAL INTENT; PARENTAL STATUS; ENGAGED OR NOT	Bayer, 1968 Clements, Note 2 Lautz et al., 1970 Panos & Astin, 1968	Kapur, 1972a Mack, 1973 Maclay, 1968
MOTIVATION (including both type of and intensity of); COMMITMENT TO GRADUATING FROM THIS COLLEGE OR OBTAINING DEGREE	Abel, 1966 Alexakos et al., 1967 Athanasiou, 1971 Baird, 1969 Bayer, 1968 Cole & Miller, 1967 Coombs & Davies, 1966 Costello, 1968 Dickason, 1969 Dole, 1969 Ellish, 1969 Entwistle et al., 1971 Goetz & Leach, 1967 Gustavus, 1972 Hackman & Dysinger, 1970 Hall, 1972 Hamilton, 1970 Hansen et al., 1972 Hill, 1966 Irvin, 1967 Jones, J. G., 1968 Kapur, 1972a, 1972b Keenen & Holmes, 1970 Lindsay & Althouse, 1969 Linn & Davis, Note 7 MacMillan, 1970 Marks, 1967 Reitz, 1970 Rossmann & Kirk, 1970 Sewell, 1971 Spady, 1971 Wegner & Sewell, 1970 Wilson, Note 9 Worthington & Grant, 1971	Lautz et al., 1970 Maclay, 1968

Appendix C (continued)

Item	Meaningful*	Not meaningful**
RACIAL, ETHNIC, OR RELIGIOUS BACKGROUND	Bayer, 1968 Dole, 1969 Kapur, 1972a, 1972b Mack, 1973 MacMillan, 1970 Panos & Astin, 1968 Spady, 1971	Hall, 1972 Maclay, 1968
RESIDENCY		
(1) in-state or out-of-state	Clements, Note 2 Mack, 1973	Lautz et al., 1970
(2) population of home town; rural or urban home; farm or non-farm	Flaugher & Rock, 1969 Hood, 1967	Baber & Caple, 1970 Bayer, 1968 Gustavus, 1972 Spady, 1971 Vraa, 1971
(3) region of origin	Dole, 1969 Gallessich, 1970	Bayer, 1968 Johansson & Rossmann, 1973
SCHOOLING		
(1) total number of schools attended		Maclay, 1968
(2) total years of education prior to admission	Reed et al., 1973	Owen & Feldhusen, 1970
SEX	Baird, 1969 Bayer, 1968 Clements, Note 2 Cole & Miller, 1967 Dole, 1969 Hamilton, 1970 Hay & Lindsay, 1969 Hill, 1966 Johansson & Rossmann, 1973 Jones, J. G., 1968 Kapur, 1972a, 1972b Lautz et al., 1970 Mack, 1973 MacMillan, 1970 Miller & O'Connor, 1969 Nichols, 1966 Panos & Astin, 1968 Robinson, 1969 Rossmann & Kirk, 1970 Savicki et al., 1968 Sewell, 1971 Skager et al., 1967 Smelser & Stewart, 1968 Spady, 1971 Warriner et al., 1966 Worthington & Grant, 1971 Zaccaria & Creaser, 1971	Ashcraft, 1969 Baber & Caple, 1970 Gustavus, 1972 Hackman & Dysinger, 1970 Hay et al., 1970 Hood, 1967 Jones, F. M., Note 5 Maclay, 1968 Merritt, 1970 Morrisey, 1971 Watley & Merwin, 1967 Weigel & Weigel, 1967

Appendix C (continued)

Item	Meaningful*	Not meaningful**
STUDY HABITS; NUMBER OF HOURS OF EFFECTIVE STUDY PER WEEK; NUMBER OF HOURS OF STUDY PER WEEK	Entwistle et al., 1971 Hinrichsen, 1972 Lautz et al., 1970 Linn & Davis, Note 7 Maclay, 1968 Robinson, 1969 Zedeck et al., 1971	Cooper & Foy, 1969 Gallessich, 1970 Gustavus, 1972 Maxwell, Note 8 Weigel & Weigel, 1967
WORKING WHILE IN COLLEGE	Hay et al., 1970	Baber & Caple, 1970
(1) employed or not; number of hours employed; salary	Hay & Lindsay, 1969 (hours employed)	Cooper & Foy, 1969 Gallessich, 1970 Hamerlik & Brown, Note 4 Hay & Lindsay, 1969 (employed or not) Henry, 1967 LeGrand et al., Note 6 Merritt, 1970
(2) relevant or not to major field of study?	Hay et al., 1970	
MISCELLANEOUS	Kapur, 1972a, 1972b	
(1) attendance, religious	Maclay, 1968	
(2) letters of readmission for those previously dropped		Schuster, 1971
(3) pre-college entrance interviews; pre-program entry ratings	Dickason, 1969 Frank & Kirk, 1970	
(4) veteran's status	Lautz et al., 1970	

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**Under this heading are listed all articles reporting that this particular descriptor or predictor did not contribute to determination of the undergraduate success criterion.